WHAT IS CLAIMED IS

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1.   An image data processing apparatus
comprising:

a part at least reducing the deviation on a
pixel having a value deviating from a predetermined
10   range through inverse transform of image data from a
frequency domain; and

a part determining a pixel which should have a
value changed in a direction reverse to the deviation
based on a character of the inverse transform.

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2.   The image data processing apparatus as
20   claimed in claim 1, wherein:

the character of the inverse transform used by
said determining part comprises polarities of elements
of a matrix through which the inverse transform is
performed.

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3.   The image data processing apparatus as claimed in clam 2, wherein the character of the inverse transform used by said determining part further comprises absolute values of the elements of the matrix

5   through which the inverse transform is performed.

10   4.   The image data processing apparatus as claimed in claim 1, wherein:

the character of the inverse transform used by said determining part comprises probabilistic magnitude relationship among products between elements of a matrix

15   through which the inverse transform is performed and quantization errors occurring in frequency transform coefficients multiplied with the elements, respectively.

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5.   The image data processing apparatus as claimed in claim 1, further comprising:

a part which, in case the pixel determined by

25   said determining part to have the value changed in the

direction reverse to the deviation then has a value
deviating from the predetermined range as a result of
having the value changed in the direction reverse to the
first occurring deviation, determines a pixel which

5   should have a value changed in a direction reverse to
the second occurring deviation based on a character of
the inverse transform.

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        6.   The image data processing apparatus as
claimed in claim 5, wherein:
        the character of the inverse transform used by
15   said part which determines the pixel which should have
the value changed in the direction reverse to the second
occurring deviation comprises the polarities of the
elements of the matrix through which the inverse
transform is performed.

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        7.   The image data processing apparatus as
25   claimed in claim 6, wherein:

the character of the inverse transform used by said part which determines the pixel which should have the value changed in the direction reverse to the second occurring deviation further comprises the absolute

5 values of the elements of the matrix through which the inverse transform is performed.

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8.   The image data processing apparatus as claimed in claim 1, wherein:

the pixel determined by the part to have the value changed in the direction reverse to the deviation

15 is one vertically, horizontally or diagonally adjacent to the pixel which has the first occurring deviation.

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9.   The image data processing apparatus as claimed in claim 5, wherein:

the pixel determined by the part to have the value changed in the direction reverse to the first

25 occurring deviation is one vertically adjacent to the

pixel which has the first occurring deviation; and

the pixel determined by the part to have the value changed in the direction reverse to the second occurring deviation is one horizontally or diagonally adjacent to the pixel having the second occurring deviation.

10. The image data processing apparatus as claimed in claim 5, wherein:

the pixel determined by the part to have the value changed in the direction reverse to the first occurring deviation is one diagonally adjacent to the pixel which has the first occurring deviation; and

the pixel determined by the part to have the value changed in the direction reverse to the second occurring deviation is one horizontally or vertically adjacent to the pixel having the second occurring deviation.

11. The image data processing apparatus as claimed in claim 5, wherein:

the pixel determined by the part to have the value changed in the direction reverse to the first occurring deviation is one horizontally adjacent to the pixel which has the first occurring deviation; and

the pixel determined by the part to have the value changed in the direction reverse to the second occurring deviation is one vertically or diagonally adjacent to the pixel having the second occurring deviation.

12. The image data processing apparatus as claimed in claim 1, wherein the amount by which the part at least reduces the deviation is the same as the amount by which the pixel should have the value changed in the direction reverse to the deviation.

13. The image data processing apparatus as

claimed in claim 1, wherein:

the inverse transform from the frequency
domain is performed on a color difference component of
the image data; and

5   the thus-obtained R, G or B value is regarded
as the data of the relevant pixel processed by said
parts.

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14.   The image data processing apparatus as
claimed in claim 1, wherein:

the inverse transform from the frequency
15 domain is performed on a brightness component of the
image data; and

the thus-obtained G value is regarded as the
data of the relevant pixel processed by said parts.

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15.   The image data processing apparatus as
claimed in claim 1, further comprising a part of
25 switching as to whether the deviation occurring on a

pixel is dealt with by causing a predetermined pixel to

have a value changed accordingly or by merely rounding

the value of the pixel originally having the deviation,

based on a quantization rate applied in quantization

5   performed on coefficients of the frequency domain.

10   16.   The image data processing apparatus as

claimed in claim 1, further comprising a part of

switching as to whether the deviation occurring on a

pixel in G value is dealt with by causing a

predetermined pixel to have a G value changed

15   accordingly or by merely rounding the G value of the

pixel originally having the deviation, based on a

quantization rate applied in quantization performed on

coefficients of the frequency domain.

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          17.   The image data processing apparatus as

claimed in claim 1, further comprising a part of

25   rounding a G value of a pixel, in case the G value

deviates from the predetermined range through the
inverse transform of image data from the frequency
domain

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      18.   The image data processing apparatus as
claimed in claim 1, wherein:

10   the image data to undergo the inverse
transform comprises image data having undergone S-
transform and thus transformed into the frequency domain,
where the S-transform has a character such that half the
frequency coefficient HH has an quantization error

15 probabilistically minimum among the frequency
coefficients LH, HL and HH/2 obtained through the S-
transform.

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      19.   The image data processing apparatus as
claimed in claim 1, wherein:

      the image data to undergo the inverse

25 transform comprises image data having undergone 5 × 3

wavelet transform or 9 × 7 wavelet transform and thus
transformed into the frequency domain; and

    said determining part determines a pixel which
should have a value changed in a direction reverse to
5   the deviation as being a pixel vertically or
horizontally adjacent to the pixel having the deviation.

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    20. An image data processing method
comprising the steps of:

    a) at least reducing the deviation on a pixel
having a value deviating from a predetermined range
15 through inverse transform of image data from a frequency
domain; and

    b) determining a pixel which should have a
value changed in a direction reverse to the deviation
based on a character of the inverse transform.

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    21. The method as claimed in claim 20,
25 wherein:

the character of the inverse transform used by said step b) comprises polarities of elements of a matrix through which the inverse transform is performed.

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22   The method as claimed in claim 21, wherein the character of the inverse transform used by said step

10   b) further comprises absolute values of the elements of the matrix through which the inverse transform is performed.

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23.   The method as claimed in claim 20, wherein:

the character of the inverse transform used by

20   said step b comprises probabilistic magnitude relationship among products between elements of a matrix through which the inverse transform is performed and quantization errors occurring in frequency transform coefficients multiplied with the elements, respectively.

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24. An information recording medium having a software program recorded therein, the software program causing a computer to execute the steps of:

a) at least reducing the deviation on a pixel having a value deviating from a predetermined range through inverse transform of image data from a frequency domain; and

b) determining a pixel which should have a value changed in a direction reverse to the deviation based on a character of the inverse transform.

25. The recording medium as claimed in claim 24, wherein:

the character of the inverse transform used by said step b) comprises polarities of elements of a matrix through which the inverse transform is performed.

26. The recording medium as claimed in claim 25, wherein the character of the inverse transform used

by said step b) further comprises absolute values of the elements of the matrix through which the inverse transform is performed.

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27. The recording medium as claimed in claim 24, wherein:

10   the character of the inverse transform used by said step b) comprises probabilistic magnitude relationship among products between elements of a matrix through which the inverse transform is performed and quantization errors occurring in frequency transform

15 coefficients multiplied with the elements, respectively.

20   28. A software program causing a computer to execute the steps of:

a) at least reducing the deviation on a pixel having a value deviating from a predetermined range through inverse transform of image data from a frequency

25 domain; and

b) determining a pixel which should have a value changed in a direction reverse to the deviation based on a character of the inverse transform.

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29. The program as claimed in claim 28, wherein:

10   the character of the inverse transform used by said step b) comprises polarities of elements of a matrix through which the inverse transform is performed.

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30. The program as claimed in claim 29, wherein the character of the inverse transform used by said step b) further comprises absolute values of the

20 elements of the matrix through which the inverse transform is performed.

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31.   The program as claimed in claim 28,
wherein:

the character of the inverse transform used by
said step b) comprises probabilistic magnitude
5   relationship among products between elements of a matrix
through which the inverse transform is performed and
quantization errors occurring in frequency transform
coefficients multiplied with the elements, respectively.